

REMARKS

Claims 1-3 are pending. By this Amendment, the amendment of claim 1 is respectfully requested.

The Office Action rejects claim 1 under 35 U.S.C. §102(b) as anticipated by Hawkins et al. If applicable to the twice amended claim 1, this rejection is respectfully traversed.

The implanted regions 32 of Hawkins et al. are so called charge transfer direction biasing implants. These so called charge transfer direction biasing implants extend parallel to the longitudinal direction of the electrodes. A part of the electrodes are used as a mask for implanting dopant ions in a self-aligned implant process with respect to the electrodes. Thus, the implanted regions 32 of Hawkins et al. are elongate and parallel to the electrodes. The reason that Hawkins implant these biasing implants through the gate dielectric is simply that the gate dielectric is necessarily already present because (1) the electrodes are needed for the self-alignment process and (2) the gate dielectric just happens to be present below these electrodes.

Hawkins et al. does not disclose "strip-shaped semiconductor regions running in a first direction" and "strip-shaped electrodes running in a second direction which is substantially perpendicular to the first direction" as specified in claim 1, and therefore contained in claims 2 and 3 dependent thereon. In contrast, Hawkins et al. discloses forming regions 32 to be parallel to the gate electrodes.

Furthermore, Hawkins et al. does not disclose a method "characterized in that the strip-shaped semiconductor regions are not formed in the silicon slice until after the gate dielectric has been provided on the surface of the silicon slice ... and the strip-shaped semiconductor regions are formed in the silicon slice before the strip-shaped electrodes are formed on the gate dielectric" as specified in claim 1 and therefore contained in claims 2 and 3 dependent thereon. In contrast, Hawkins et al. discloses forming regions 32 after gate electrodes are formed.

Accordingly, withdrawal of the rejections of claim 1-3 is earnestly solicited.

The Office Action rejects claims 2, 3 under 35 U.S.C. §103(a) as being unpatentable over Hawkins et al. The Office Action asserts "The rejection is maintained as stated in the

paper mailed 7/31/02 and as stated above." If applicable to the pending claims 2, 3, this rejection is respectfully traversed.

Hawkins does not disclose the preferred method of forming the silicon nitride part of the gate dielectric according to the present invention, namely Low Pressure (!) Chemical Vapor Deposition as specified by claim 2, and therefore contained in claim 3 dependent thereon. The same holds for the preferred thickness of said silicon nitride part of the gate dielectric. Hawkins et al., at one location (see column 9, lines 14-15), discloses that said silicon nitride is between 5 and 30 nm. Hawkins et al. does not disclose, teach or suggest that the thickness should preferably be above 50 nm as specified by claim 3. These features provide the present invention with distinct advantages over the applied art. For example, the present invention provides important and surprising advantages in that it results in an image sensor with a low dark current and which is substantially free of fixed pattern noise and image errors in the form of white spots. The applied art does not appreciate that the claimed method provides these advantages. Absent recognition of these advantages, there is no motivation to modify the processes disclosed in the applied art to achieve the claimed method. Accordingly, withdrawal of the rejections of claim 2 and 3 are earnestly solicited.

The Office Action fails to establish a *prima facie* case that claims 2-3 would have been obvious to a person of ordinary skill in the art. The United States Supreme Court established the basic rules for analyzing the obviousness of an invention and articulated three factual inquiries to be made in an obviousness determination. *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966). This analysis requires a factual inquiry into (1) the scope and content of the prior art, (2) the differences between the prior art and the claimed subject matter, and (3) the level of skill of a person of ordinary skill in the art at the time the invention was made. The M.P.E.P. instructs that "examiners should apply the test for patentability under 35 U.S.C. §103 set forth in *Graham*." See M.P.E.P. 2141 through 2143.

The determination of obviousness under 35 U.S.C. §103(a) is a legal conclusion that must be based on factual evidence. *Burlington Indus., Inc. v. Quigg*, 822 F.2d 1581, 1584, 3 USPQ2d 1436, 1439 (Fed. Cir. 1987). The results of the factual inquiries articulated in *Graham v. John Deere Co.* provide the factual basis upon which the legal conclusion of

obviousness is to be based. This factual basis is usually articulated in factual findings. Nevertheless, the factual basis, whether articulated in factual findings or not, must be supported by substantial evidence supporting the factual basis. For example, substantial evidence of prior art might be an issued patent describing such prior art. It is respectfully submitted that the Office Action fails to support a legal conclusion of obviousness with a factual basis that is based on substantial evidence. Assertions of Patent Office personnel do not constitute evidence.

The U.S. Patent and Trademark Office bears the initial burden of establishing that the claimed invention is *prima facie* obvious. *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984). M.P.E.P. 4142 instructs that the "examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness."

To establish a *prima facie* case of obviousness, the Patent and Trademark Office must demonstrate by substantial evidence that the prior art relied upon, coupled with the knowledge generally available in the art at the time of the invention, contains some suggestion or incentive that would have motivated an ordinarily skilled person to modify the subject matter of a reference or combine the subject matters of the references to achieve the claimed subject matter. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). M.P.E.P. 2143.01 instructs that "Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art."

More specifically, the Office Action provides no factual evidence that the silicon nitride layer, as used in the present novel and unobvious method, should be formed by LPCVD. The Office Action merely takes official notice that LPCVD is known and asserts that "It would have been within the scope of one of ordinary skill in the art to combine the known process with that of Hawkins et al. to enable formation of nitride layer 16." Mere assertions that "it would have been within the scope of someone skilled in the art" does not provide, or even assert, evidence of any motivation to combine or modify the process.

A difference between the applied art and the subject matter of pending claim 3 is the claimed feature that the thickness of the silicon nitride is 50 nm. The applied art discloses a thickness of 5 to 30 nm. The Office Action asserts that "One of ordinary skill in the art would have been motivated to arrive at applicant's recited thickness of nitride film through routine experimentation to achieve desired device properties and desired device dimensions and associated device densities on the finished wafer." This assertion is respectfully traversed as it is hindsight. The Office Action provides no evidence of any motivation to form the "at least 50 nm" silicon nitride film as specified by claim 3.

The Office Action fails to allege a factual basis, and fails to provide any evidence supporting a factual basis, for modifying the process disclosed in the applied art as specified in claims 2-3.

Establishment of a suggestion or incentive to modify or combine prior art references requires substantial evidence of such suggestion or incentive. The factual question of motivation is material to patentability, and it cannot be resolved on a subjective belief of unknown authority. Office Action assertions of such suggestion or motivation, without evidentiary support, are merely subjective belief and are insufficient to constitute substantial evidence upon which a legal conclusion can be based. Substitution of common knowledge and common sense for a factual finding of motivation is nothing more than a conclusory statement that does not fulfill the Patent and Trademark Office's obligation to set forth reasoned findings. *In re Lee*, 61 USPQ2d 1430 (Fed. Cir. 2002).

Accordingly, withdrawal of the rejection of claims 2-3 is earnestly solicited.

CONCLUSION

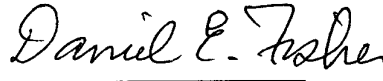
In view of the present amendments and remarks, withdrawal of the rejection of the claims is earnestly solicited. It is respectfully submitted that the present application is in condition for allowance. Prompt reconsideration and allowance of the application are earnestly solicited. Should the examiner believe that any further action is necessary to place the application in condition for allowance, the examiner is invited to contact the undersigned applicant representative at the telephone number listed below.

The Commissioner is hereby authorized to charge any fees (or credit any overpayment) associated with this communication to Deposit Account No. 04-1425.

Respectfully submitted,

DORSEY & WHITNEY LLP

By:



Daniel E. Fisher
Registration No. 34, 162

Customer No. 27082
Dorsey & Whitney, LLP
Intellectual Property Department
Suite 400 South
1001 Pennsylvania Avenue, N.W.
Washington, D.C. 20004-2533
(202) 442-3000 (telephone)
(202) 442-3199 (facsimile)
April 8, 2003